

washed by the same heavy tempestuous rains. Along by far the larger part of the immensely-extended coast-line of these islands no raised beach could have been formed, or, if formed, could have remained until now. So rapid is the retreat even of the solid cliffs, that both there and in Caithness a Pict's house may now and then be found, from which the outer walls on the seaward side have disappeared, together with the solid ground on which they stood, while the surge is ever breaking at the base of the cliff below. Even into the sheltered inlets the same vertical sea-cliffs often run, so that the possible localities for the formation and preservation of raised beaches are comparatively few in number. A more diligent search among these few resting-places may yet reveal the existence of some fragments of marine terraces in Orkney. In the meantime the want of raised beaches in Caithness, where, to judge from the proximity of those in Sutherland, they probably at one time existed, should put us on our guard against a too hasty and sweeping inference from their absence in Orkney.

With regard to Shetland, however, the case is far stronger. Rocks of many varied kinds form the islands of that group running out into ridges and chains of islets, and inclosing innumerable *vöes* and land-locked inlets. Nowhere could there be a more admirable surface for the formation and conservation of raised-beaches. The absence of these deposits cannot therefore be accounted for except, as I am constrained to believe, on the supposition that they never existed there at all. That interrupted elevation of the land, to the pauses in which the raised-beaches point, seems to have lessened towards the north. It is still traceable by means of these terraces on the northern shores of the mainland. Evidence of it has not been detected in Orkney, though as I have said, this may not show that it did not affect these neighbouring islands. But when we recede to the far Shetlands, all trace of the former lower level of the land ceases—at least it is not preserved in lines of raised beach.

ARCH. GEIKIE

PENNINGTON'S "BARROWS OF DERBYSHIRE"

Notes on the Barrows and Bone-Caves of Derbyshire. With an Account of a Descent into Eläen Hole. By Rooke Pennington, B.A., LL.B., F.G.S. (London: Macmillan and Co., 1877.)

MR. PENNINGTON has done good service to science by publishing his "Notes." The objects he describes belong to the palæolithic, the neolithic, and the bronze ages of Britain and Western Europe generally; but, following Prof. Boyd Dawkins, the author includes the entire period between the close of the palæolithic age and the earlier part of the iron age under the comprehensive name of the prehistoric ages. Moreover, to bring the eras of the archæologist into correlation with those of the biologist, he reminds the reader that during the prehistoric ages, "the animals living in Europe were generally speaking the same as those which live there now," whilst palæolithic man was accompanied by the mammoth, and many other extinct forms.

The author's prehistoric researches were conducted partly in caverns, but mainly in barrows. The latter,

usually heaps of stone and turf, were either of an oblong form, or, much more frequently, "round heaps, like a basin or saucer turned upside down."

The circular barrows appear to have been in some cases nearly fifty feet in diameter, and fully five feet high at the centre. That on Abney Moor was surrounded with a rampart of earth fifty feet in exterior diameter, and having on it ten upright equidistant stones about three feet high, whilst the inclosed mound measured but twenty feet across. Almost all the barrows appear to have yielded human bones, and in some instances more or less complete skeletons, some of which occupied stone cists, whilst others did not. The body of a young man, about seventeen years of age, had the skull protected with four stones, one being a cap stone, whilst large pieces of limestone were piled irregularly round the rest of the skeleton. All the bodies found entire were in a contracted position, and there seems to have been a tendency to place them on the left side, facing north or north-westerly. Two or more skeletons were found in some cases in the same barrow, and two were met with in the same cist in a barrow on Gautriss Hill. In Siggett barrow the skeleton of a child was found very near the feet of that of an adult. Some of the barrows contained evidence of cremation; thus, in the centre of that on Abney Moor was a large flat piece of sandstone, on which human bones, accompanied by flint flakes, a chert flake, beads of jet and of amber, and a good arrow head, had been carefully deposited. There was satisfactory evidence that the funeral fire had been lighted on the spot.

Relics of water-rat, horse, red deer, roe deer, *Bos longifrons*, goat, hog, and dog were also found in the barrows, and, with the exception of the first only, commingled with the human remains. In a cist in Oxlow barrow part of a boar's tusk had been placed with the human skeleton. The horse, roe deer, goat, and dog appear to have been the least prevalent forms. On the other hand, when speaking of water-rats, the author says, "I never explored either a burial mound or a cave without finding plenty of them;" and in one instance he says "Rats came out by spadefuls."

Of articles made or selected by man the barrows yielded a cut antler, quartzite and other "foreign" pebbles, chipped flints, pottery, chert flakes, beads of jet and of amber, holed stone hammers, bone pins, arrow heads, and bronze rings and celts.

The prehistoric caves and "rock shelters" situate in Cave Dale, Hartle Dale, and Creswell Crags, contained, with the exception of roe-deer only, remains of all the barrow animals, and of wolf, fox, shrew, badger, cat, hare, rabbit, duck, and fowl, in addition. They also yielded flint flakes, a holed sandstone hammer, charcoal, pottery, some of which was Roman, a cut stag's horn, a bone comb, pieces of jet, a celt and some ornaments in bronze, a few iron articles, and a coin of Hadrian.

When speculating on his discoveries the author remarks of the skeleton of the youth supposed to be about seventeen, that the people who buried him must have been "actuated by some other feelings of respect than those springing simply from personal valour or wisdom. This boy must have been of some rank; possibly the eldest son of the chief. The rudiments of government and of

hereditary station seem to have existed, for it was not every person who was honoured by so large a cairn."

The contents of the long-shaped barrows differed from those of circular outline. The former contained neither metals nor burnt bodies; all the human skulls were long or "boat-shaped;" and the barrows seemed of higher antiquity than the others.

The neolithic and the bronze people had similar customs; each disposed of their dead by cremation, as well as by burying some of them entire and in a contracted position; each used polished stone celts, and jet and amber ornaments; each made coarse pottery, and ornamented it with the same rude designs; and during each period the skulls of some of the people were long and narrow, whilst those of others were round.

The evidence of infanticide, slaughter of slaves, and cannibalism during the prehistoric ages is thought to be too conclusive to admit of doubt.

We must content ourselves with a brief mention of the Palæolithic "finds" described by the author. He first found bones in 1870 in Windy Knoll quarry, near the northern part of the mountain limestone of Derbyshire. Aided by Mr. Tym he began systematic work there in 1874, and Prof. Boyd Dawkins joined them in 1876. A cavity in the rock—not a cavern—proved to be crammed with remains of grizzly bear, wolf, fox, water-vole, shrew, bat, bison, reindeer, roe deer, hare, and rabbit. Omitting vast numbers of mere fragments, there were more than 3,500 bones and teeth of bison, of which a large number were calves; 1,200 specimens of reindeer, also including calves, but in a lower ratio; and sixty canine teeth of grizzly bear—the only ursine species met with. The remains varied much in their state of preservation, but a very large number were perfect, and many were in their proper relative positions.

The history of the "find" was probably this:—"A swampy place was resorted to by the migrating herds of bison and reindeer. The overflow would escape into the 'water-swallow' hard by, a precipitous place into which animals might and did fall." There was no trace of mammoth, rhinoceros, hyæna, or man.

A fissure in a mountain limestone quarry at the Staffordshire village of Water-houses yielded, in 1864, remains of mammoth, hippopotamus, and rhinoceros, about twenty feet below the surface of a deposit of loam and angular fragments of limestone, and containing a number of quartz pebbles. In 1873 relics of bison, horse, and wolf, were met with in a prolongation of the same fissure, but at not quite so low a level. The bones were probably all of them those of animals which had fallen in.

Mr. Pennington has increased the value of his book by giving an account of the Rev. Mr. Mello's discoveries in the caverns of the Permian formation at Creswell Crags, on the confines of Derby and Nottingham shires. Mr. Mello began his researches in 1875, and in 1876 an exploring committee was formed, who have thoroughly examined the Pin Hole, Church Hole, and Robin Hood Caves. In the last the deposits were, 1st, or uppermost, soil containing Romano-British relics; 2nd, breccia; 3rd, light-coloured "cave-earth;" 4th, a mottled bed; and 5th, or lowest, red sand. Remains of extinct animals occurred in the lowest three, and included *Machairodus latidens*, cave lion, leopard, wild cat, cave hyæna, wolf, fox,

Arctic fox, glutton, grizzly bear, brown bear, pole-cat, water-vole, mammoth, woolly rhinoceros, horse, bison, reindeer, great Irish deer, wild boar, and hare. We observe, however, that Prof. Boyd Dawkins does not mention the Arctic fox, or the glutton, or the wild boar as amongst the "finds" (see *Quart. Journ. Geol. Soc.*, No. 131, pp. 590, 602). The remains of hyæna were very numerous, and the condition of the older osseous relics betokened that at least most of them had been introduced by him. The author is of opinion that the fauna was Arctic or north temperate.

The lower deposits contained large numbers of broken and chipped fragments of quartzite, which must have been derived from a distance. Flint flakes occurred in hundreds, and of all sizes and forms, in the upper layers, where quartzite fragments were but few. Scrapers and lance-points were the commonest of the flint tools. Bone implements were also met with, and included a needle and a pin or lance-head, &c. There was also a sketch of a horse on a piece of flat bone—the first, and, up to the present time, the only example of palæolithic fine art found in Britain. The explorers also met with a piece of amber and bits of charcoal, and found reason to believe that the hare was largely used as food. The amber does not appear to be mentioned by Prof. Dawkins.

Our limited space forbids us to follow the author through his interesting speculations on palæolithic anthropology; but we cannot help doubting whether the exploring committees of the caverns near Settle and Torquay will endorse his opinion that "no caverns in this country have furnished such a variety of evidence as to ancient man and the animals which furnished him with food and clothing" as those of Creswell Crags. Those of us who at the close of the Plymouth meeting of the British Association, visited the caverns at Brixham and Torquay, and noted that they almost overhang the sea, cannot but regard the author's proposition that "the palæolithic cave dweller of England was an inlander" as being much too sweeping.

Finally, whilst perusing the volume which we now close reluctantly, we have again and again caught ourselves wishing that anthropologists would supply us with good definitions of "savage" and "barbarian," and tell us whether the words are to be used as synonyms.

OUR BOOK SHELF

Mathematical Questions, with their Solutions, from the "Educational Times." Edited by W. J. C. Miller, B.A. Vol. xxvii. from January to June, 1877. (London: C. F. Hodgson and Son.)

JUST fifteen years ago we became aware, by the chance sight of a copy of the *Educational Times*, of the existence of a paper which gave up three or four pages monthly to the proposal and solution of mathematical questions. We at once sent to England, and a more careful examination of the copy we received showed us that it was a publication of very high merit, at least as regarded this one department. Hitherto we had in the main confined our mathematical reading to the usual rut passed over by mathematical masters who have only to do with the teaching of ordinary boys; now we were induced to join the, at that date, small band of contributors who rallied round the mathematical editor and derived much pleasure and profit from the study of the many